YAKEEN NEET 2.0

2026

Vectors

Physics

Assignment Solution 01

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Question-01

Which of the following statements is false:

1. Mass, speed and energy are scalars ✓
2. Momentum, force and torque are vectors ✓
3. Distance is a scalar while displacement is a vector
   How far ✓
4. A vector has only magnitude whereas a scalar has both magnitude and direction ✗

Ans – 4

Question-02

Which of the following physical quantities is an axial vector?

1. Displacement
2. Force
3. Velocity
4. Torque

Question-03

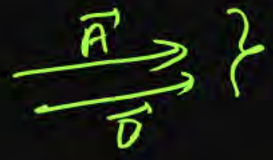
The direction of the angular velocity vector is along:

1. Along the tangent of circular path
2. Along the direction of radius vector
3. Opposite to the direction of radius vector
4. Along the axis of rotation

Question-04

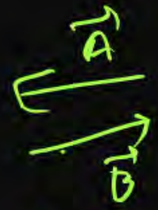
True/False

(i) All parallel vectors are equal vectors. F



(ii) All equal vectors are also parallel vectors. T

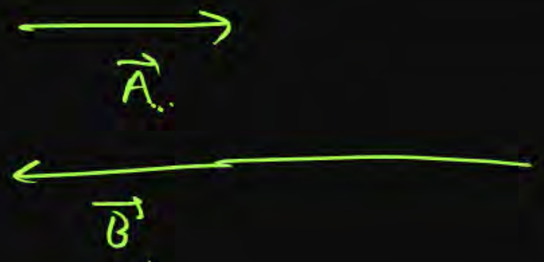
(iii) All opposite vectors are (antiparallel) vectors. ✓



(iv) Unit vectors of two antiparallel vectors will be opposite vectors. ✓

magnit 1

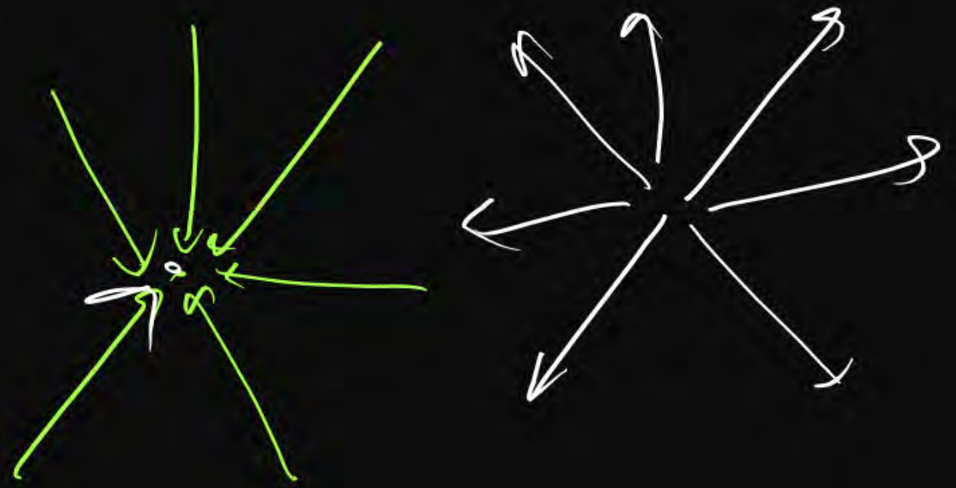
dirn opposite



Question-05

The forces, which meet at one point but their lines of action do not lie in one plane, are called:

1. non-coplanar and non-concurrent forces
2. coplanar and non-concurrent forces
3. non-coplanar and concurrent forces
4. coplanar and concurrent forces



Question-06

If $\vec{A} = \alpha\hat{i} + 0.2\hat{j} + 0.8\hat{k}$ is a unit vector, then find the value of α

$$|\vec{A}| = 1 = \sqrt{\alpha^2 + (0.2)^2 + (0.8)^2}$$

$$1 = \alpha^2 + 0.04 + 0.64$$

$$1 - 0.68 = \alpha^2$$

$$\alpha = \sqrt{0.32}$$

Question-07

If $\vec{A} = 2\hat{i} + 3\hat{j} + \hat{k}$ then find it's unit vector?

$$\vec{A} = 2i + 3\hat{j} + \hat{k}$$

$$|\vec{A}| = \sqrt{4 + 9 + 1}$$

$$= \sqrt{14}$$

$$\hat{A} = \frac{\vec{A}}{|\vec{A}|} = \frac{2i + 3\hat{j} + \hat{k}}{\sqrt{14}}$$ ✓

Question-08

If $\vec{A} = \hat{i} + 2\hat{j} + 2\hat{k}$ and $\vec{B} = \alpha\hat{i} + 6\hat{j} + 6\hat{k}$ are parallel vectors then find the value of α?

$$\vec{A} = i + 2\hat{j} + 2\hat{k} \qquad \sqrt{1^2+2^2+2^2}$$

$$\vec{B} = \alpha i + 6\hat{j} + 6\hat{k}$$

$$\frac{i+2j+2k}{\sqrt{9}} = \frac{\alpha i + 6j + 6k}{\sqrt{\alpha^2+36+36}}$$

$\vec{A}$ and $\vec{B}$ dir same

$$\frac{i+2j+2k}{3} = \frac{\alpha i + 6j + 6k}{\sqrt{\alpha^2+72}}$$

$$\frac{i}{3} = \frac{\alpha i}{\sqrt{\alpha^2+72}}$$

$$3\alpha = \sqrt{\alpha^2+72}$$

$$9\alpha^2 = \alpha^2 + 72$$

$$8\alpha^2 = 72$$

$$\alpha = \sqrt{9} = 3$$

Imp* $\frac{A_x}{A_y} = \frac{B_x}{B_y}$

$$\frac{1}{2} = \frac{2}{6_3}$$

$\alpha = 3$

Question-09

If $\vec{A} = \hat{i} + 2\hat{j} + 2\hat{k}$ and $\vec{B} = 2\hat{i} - 6\hat{k}$, then find a new vector $\vec{C}$ which as magnitude equal to $\vec{A}$ and in the direction of $\vec{B}$?

$|\vec{C}| = |\vec{A}|$

$\hat{C} = \hat{B}$ ← given in question.

$\vec{C} = |\vec{C}|\,\hat{C}$

$\vec{C} = |\vec{A}|\,\hat{B} = 3\left(\frac{2i - 6\hat{j}}{40}\right)$ ✓

$|\vec{A}| = \sqrt{1^2 + 2^2 + 2^2}$

$= \sqrt{9}$

$= 3$

$\hat{B} = \frac{\vec{B}}{B} = \frac{2i - 6k}{\sqrt{2^2 + (-6)^2}} = \frac{2i - 6k}{40}$

Question-10

If $\vec{A}+\vec{B}=\vec{C}$ and $|\vec{A}|=5, |\vec{B}|=3$ and $|\vec{C}|=6$ then find angle between $\vec{B}$ and $\vec{C}$.

1. $60°$
2. $37°$
3. $\cos^{-1}\left(\frac{5}{9}\right)$
4. $\cos^{-1}\left(\frac{1}{15}\right)$

$\vec{A}+\vec{B}=\vec{C}$

$\vec{A}=\vec{C}-\vec{B}$

$\vec{A}=\vec{C}+(-\vec{B})$

Ex $\vec{A}=\vec{C}+(-\vec{B})$

$|\vec{A}|=\sqrt{C^2+B^2-2CB\cos\theta}$ → Angle b/t C & B

$5=\sqrt{36+9-2\times6\times3\cos\theta}$

$25=45-36\cos\theta$

$36\cos\theta=45-25$

$\cos\theta=\frac{20}{36}=\frac{5}{9}$

$\theta=\cos^{-1}\left(\frac{5}{9}\right)$

Question-11

If $|\vec{A}+\vec{B}| = |\vec{A}| + |\vec{B}|$ then angle between $\vec{A}$ and $\vec{B}$ will be

1. $0°$

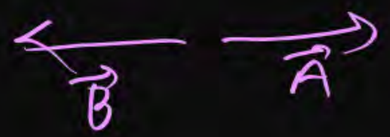
$|\vec{A}+\vec{B}| = A+B$

2. $90°$
3. $180°$
4. $30°$

Question-12

If $|\vec{A} - \vec{B}| = |\vec{A}| + |\vec{B}|$ then angle between $\vec{A}$ and $\vec{B}$ will be

1. $0°$



2. $90°$
3. $180°$
4. $30°$

Question-13

If the angle between two vectors increases, the magnitude of their resultant

1. decreases
2. increases
3. remains unchanged
4. first decreases and then increases

Question-14

If $|\vec{A}+\vec{B}| = |\vec{A}-\vec{B}|$ then which of the following option will be correct?

1. Magnitude of $\vec{A}$ may be zero.
2. Magnitude of $\vec{B}$ must be zero.
3. Angle between $\vec{A}$ and $\vec{B}$ must be $90°$
4. Angle between $\vec{A}$ and $\vec{B}$ may be $90°$

$|\vec{A}+\vec{B}| = \sqrt{A^2+B^2+2AB\cos\theta}$

$|\vec{A}-\vec{B}| = \sqrt{A^2+B^2-2AB\cos\theta}$

Question-15

If resultant of two unit vector is also a unit vector then angle between these two vector will be

1. 0
2. $\pi/6$
3. $\pi/3$
4. $2\pi/3$

Question-16

If difference of two unit vector is also a unit vector then angle between these two vector will be

1. 0
2. $\pi/6$
3. $\pi/3$
4. $2\pi/3$

Two vector of same magn is subtract then then magnitude of their diff^{n}

$D = 2A \sin(\theta/2)$

$1 = 2 \times 1 \times \sin(\theta/2)$

$\frac{1}{2} = \sin(\theta/2)$

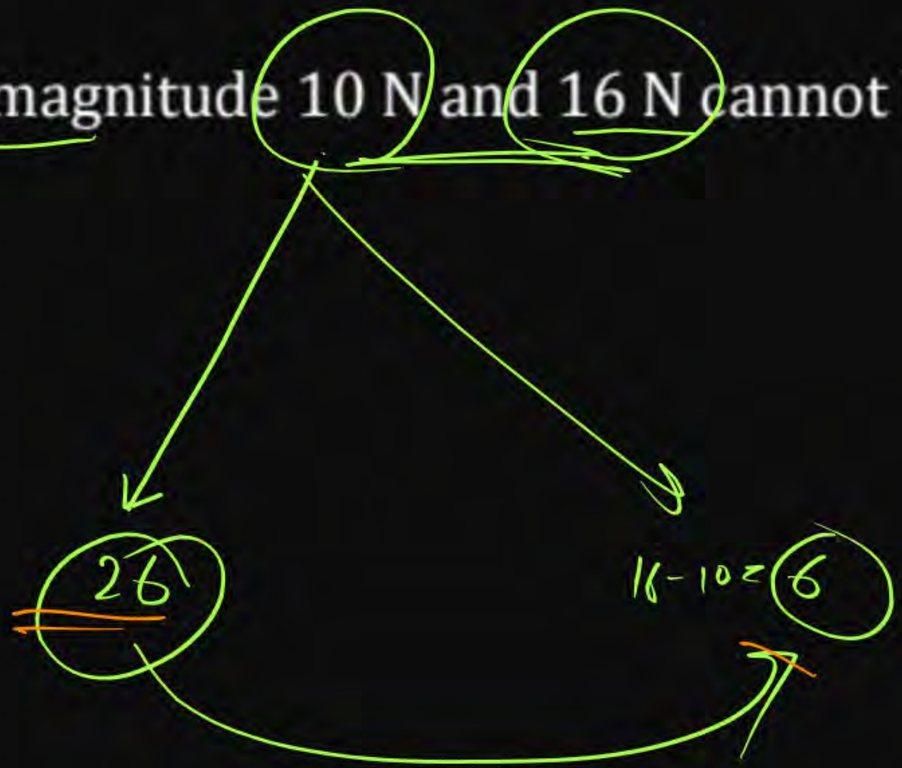
$\frac{\theta}{2} = 30$

$\theta = 60$

Question-17

The vector sum of two vectors of magnitude 10 N and 16 N cannot be

1. 2N
2. 8N
3. 18N
4. 20N



Ans (1)

Question-18

Which of the following pair of forces may give zero resultant?

1. (5N, 15N, 21N)
2. (3N, 5N, 1N)
3. (3N, 5N, 6N)
4. (1N, 2N, 4N)

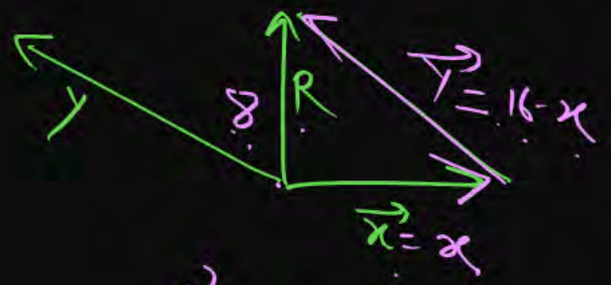
Question-19

Sum of magnitude of two vectors is 16 unit and magnitude of their resultant is 8 unit. Resultant vector is perpendicular to the smaller vector, then find magnitude of these two vector?

$$\vec{x} + \vec{y} \neq 16$$

$$x + y = 16$$

$$|\vec{x} + \vec{y}| = 8$$

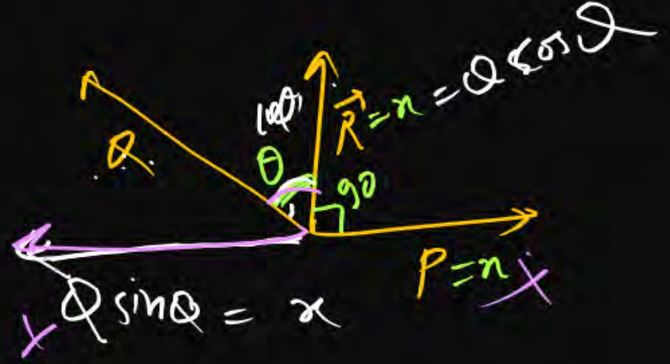


$$8^2 + x^2 = (16 - x)^2$$

fix x

Question-20

If resultant $\vec{R}$ of vectors $\vec{P}$ and $\vec{Q}$ is perpendicular to $\vec{P}$ and $|\vec{P}| = |\vec{R}|$ then find angle between $\vec{P}$ and $\vec{Q}$?



$$\frac{Q\sin\theta = x}{Q\cos\theta = x}$$

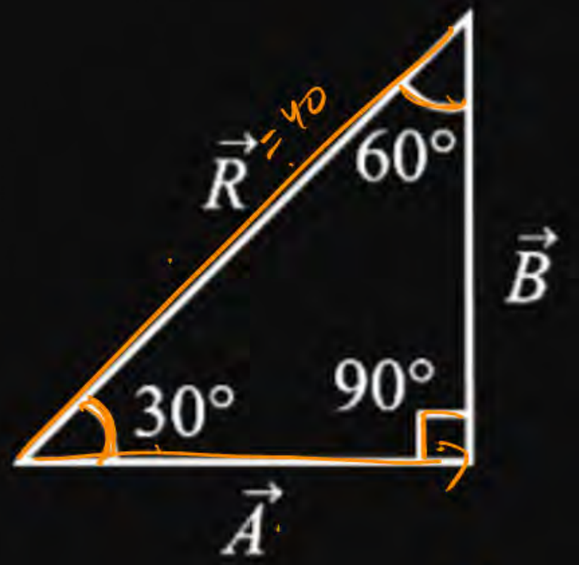
$$\tan\theta = 1$$

$$\theta = 45$$

$$\vec{P} \text{ & } \vec{Q} = 90 + 45 = 135^\circ$$

Question-21

If resultant of two vectors makes 30° and 60° with these vectors and has a magnitude of 40 units, then find magnitude of these vectors?



$\cos 30° = \frac{A}{40}$

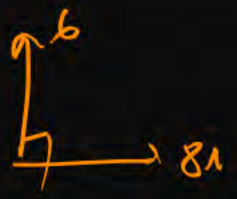
$\frac{\sqrt{3}}{2} = \frac{A}{40}$

$20\sqrt{3} = A$

Question-22

If two force of 6N and 8N are acting perpendicular to each other then net force on the object will be?

1. 14N
2. $\sqrt{}10N$
3. 2N
4. $10\sqrt{2}N$



$R = \sqrt{8^2 + 6^2}$

$= \sqrt{64 + 36}$

$= \sqrt{100}$

Question-23

If $|\hat{A} - \hat{B}| = \sqrt{2}$ then calculate the value of $|\hat{A} + \sqrt{3}\hat{B}|$?

1. 1
2. 2
3. $\sqrt{2}$
4. $\sqrt{3}$

$|\hat{A}| = 1$

$|\hat{B}| = 1$

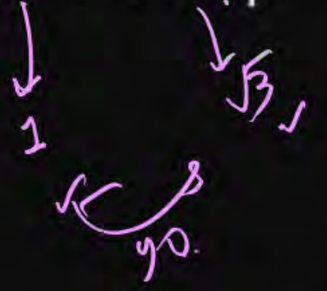
$D = 2A \sin\theta/2$

$\frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} \times 1 \sin\theta/2$

$\frac{1}{\sqrt{2}} = \sin\theta/2$

$\frac{\theta}{2} = 45°$

$\theta = 90$



$|R| = \sqrt{1^2 + (\sqrt{3})^2 + 2 \times 1 \times \sqrt{3} \cos 90}$

$= \sqrt{1+3}$

$= \sqrt{4}$

$= 2$

Question-24

Statement-I: A vector is a quantity that has both magnitude and direction and obeys the triangle law of addition.

Statement-II: The magnitude of the resultant vector of two given vectors can never be less than the magnitude of any of the given vector.

$|\vec{A}| = 4 \quad |\vec{B}| = 6$

1. Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
2. Both Statement-I and Statement-II are correct but Statement-II is not the correct explanation for Statement-I
3. Statement-I is correct but Statement-II is incorrect.
4. Statement-I is incorrect but Statement-II is correct.

Question-25

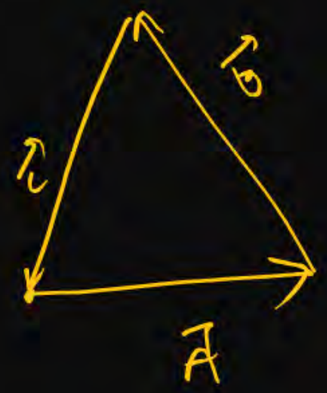
Find the resultant of three vectors and shown in the following figure. Radius of the circle is R.

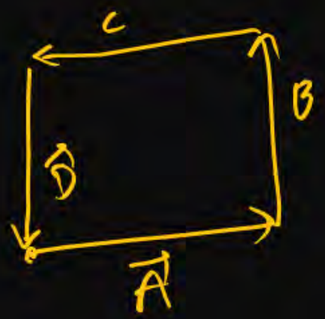
1. $2R$
2. $R(1+\sqrt{2})$
3. $R\sqrt{2}$
4. $R(\sqrt{2}-1)$

Question-26

A set of vectors taken in a given order gives a closed polygon. Then the resultant of these vectors is a

1. scalar quantity
2. pseudo vector
3. unit vector
4. ✓ null vector

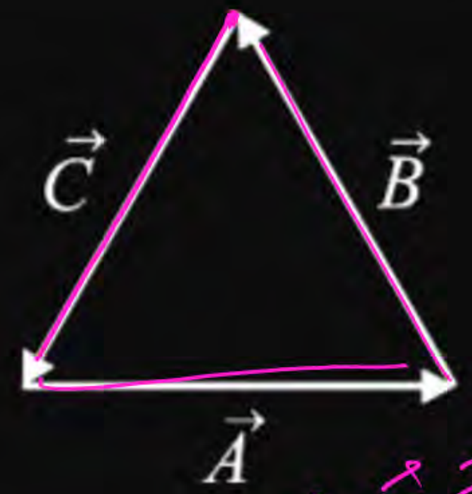




Question-27

Which of the following option is correct for given figure?

1. $\vec{A} = \vec{B} + \vec{C}$
2. $\vec{B} = \vec{A} + \vec{C}$
3. $\vec{C} = \vec{A} + \vec{B}$
4. $\vec{A} + \vec{B} + \vec{C} = 0$ ✓



$\vec{C} + \vec{A} + \vec{B} = 0$

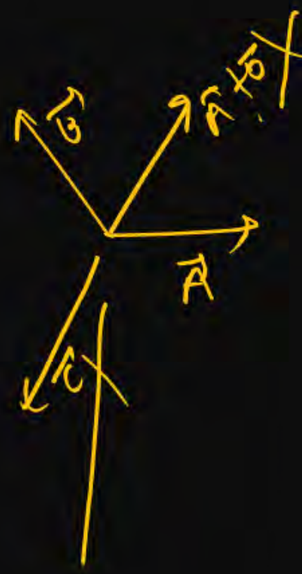
Question-28

Number of vectors of zero resultant

(i) Minimum number of non-zero forces required for zero resultant? → Ans (2)

(ii) Minimum number of non-zero unequal forces required for zero resultant? → 3

(iii) Minimum number of non-coplanar forces required for zero resultant? → 4



THANK YOU